

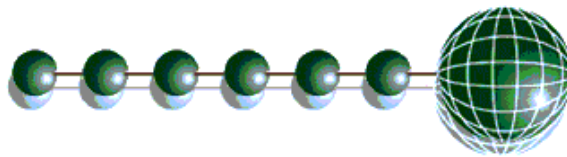
# Mercury 2 I/O Module Installation Guide



**For Product: -  
PR0710-IOR**



Ensure that all power is  
switched off before  
installing or maintaining  
this product



**Table of Contents:**

**THE MERCURY RANGE ..... 3**

**Description ..... 3**

**Configuration ..... 3**

**Networks..... 3**

**Input/Output Allocation Tables ..... 4**

**Front Panel Features ..... 5**

    LED's: - ..... 5

        Valve LED..... 5

        Fans LED..... 5

        Lights LED ..... 5

        Defrost LED ..... 5

        On-Line..... 5

        Service..... 5

        Alarm ..... 5

        HACCP ..... 5

    Keys ..... 5

    Main Display..... 5

**Setting up the controller ..... 6**

    Set-up Mode..... 6

    Set-up through front buttons ..... 6

    Set-up Function Menu..... 6

**Recommended set-up method ..... 7**

    rtc. Real time clock (This will automatically synchronise on network systems) ..... 7

    PArA. Set/view parameters (This can be achieved at the network front end) ..... 7

**Parameter Table:..... 7**

    Parameter table for I/O Module..... 7

**Network Configuration ..... 8**

    485 Legacy module..... 8

    Fast Network Address Reset ..... 9

    IP Futura module..... 9

        IP-L ..... 9

        IP-r ..... 10

**Normal Operation ..... 10**

**Viewing ..... 10**

    Input/Output table for Remote Module..... 10

**Display Messages..... 10**

**Remote Commands ..... 11**

**Specification ..... 12**

    Power requirements: ..... 12

    Relays ..... 12

    Warning:..... 12

    Comms:..... 13

**Installation:..... 13**

    Fixing:..... 13

    Clearances: ..... 13

**Cleaning: ..... 13**

**Appendix 1 ..... 14**

    Using the I/O module with the Data Builder (Controller Editor) Program ..... 14

    Analogue Input block properties: ..... 14

    Digital Output Block properties ..... 15

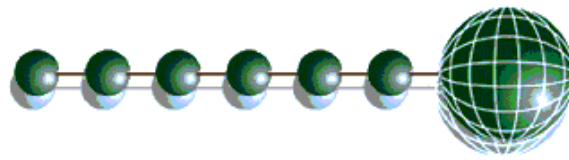
    Analogue Output Block properties ..... 15

    Control State Values: - ..... 15

**REVISION HISTORY..... 16**



Ensure that all power is switched off before installing or maintaining this product



## The Mercury Range

From Resource Data Management

**This documentation refers to the Mercury 2 I/O Module**

### Description

The Mercury 2 I/O module is intended for use with the Data Builder Program, to access networked I/O. There is no functional program inside the I/O module, its inputs and outputs are all available to be used as remote I/O by the Data Builder running on a Data manager or data Director (See Controller Editor in appendix 1). Each input has to be locally configured before use, see parameter table for set-up options. When an input is configured for probe use, a switched resistor can be used as a digital switch on that channel.

The I/O module supports the following probe types: -

- PT1000
- NTC470R
- NTC700R
- NTC2k
- NTC2k25
- NTC3k
- NTC5k
- NTC6k
- NTC10K

### Configuration

The I/O module is delivered pre-configured with all 6 input channels as PT1000 probes.

### Networks

The controllers are capable of connecting to either a TCP/IP local area network or a RS485 network or controlling in standalone mode with no network output.

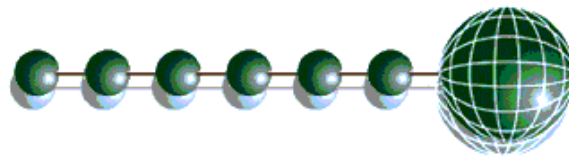
To connect to a network you must add the correct communications module.

- 485 Legacy module (Part No PR0026)
- IP Futura module (Part No PR0016)

Connecting to either of these communication modules will automatically be detected on power up and this will affect the set up screens made available to you.



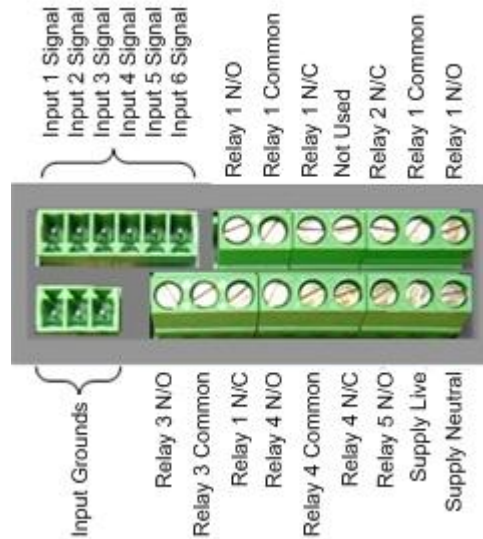
Ensure that all power is switched off before installing or maintaining this product



## Mercury 2 Remote I/O Installation guide

### Connections

All connections are made to the back of the controller. The diagram below shows the connection detail. Inputs and outputs are assigned according to the chosen configuration. See [Specification](#) for further details on connections.



**Do not connect an earth.**

### Input/Output Allocation Tables

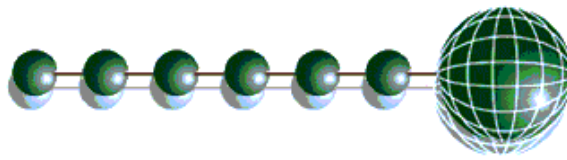
Monitor	Description	Alarm Action	Switch Function (resistor*)
Input 1	Probe or Plant	N/A	Yes when in probe mode
Input 2	Probe or Plant	N/A	Yes when in probe mode
Input 3	Probe or Plant	N/A	Yes when in probe mode
Input 4	Probe or Plant	N/A	Yes when in probe mode
Input 5	Probe or Plant	N/A	Yes when in probe mode
Input 6	Probe or Plant	N/A	Yes when in probe mode
Relay 1	Relay with Common, N/O & N/C	N/A	N/A
Relay 2	Relay with Common, N/O & N/C	N/A	N/A
Relay 3	Relay with Common, N/O & N/C	N/A	N/A
Relay 4	Relay with Common, N/O & N/C	N/A	N/A
Relay 5	N/O relay (outputs the supply voltage)	N/A	N/A

\* For PT1000 probes, use 820 Ohm switched resistors  
 For NTC470R and NTC700R probes, switch resistor features are not available  
 For NTC 2k, NTC2k25, NTC3K use 590 Ohm switched resistors  
 For NTC5k, NTC6k and NTC10K Use 2k7 Ohm switched resistors

Relays 1 to 4 : (Software) Outputs shows Off = Relay Energised  
 Relay 5 : (Software) Outputs shows Off = Relay De-Energised



Ensure that all power is switched off before installing or maintaining this product



### Front Panel Features

#### LED's: -

##### Valve LED

*Not used*



##### Fans LED

*Not used*



##### Lights LED

*Not used*



##### Defrost LED



##### On-Line



- Off No network attached
- Flashing Attempting to Log on to network
- Steady On-line

##### Service

*Not used*



##### Alarm



##### HACCP

*Not used*



#### Keys

Enter



Up



Down



Defrost



Note: Function keys illuminate when pressed, illumination is turned off 20 seconds after the key is used. Press and hold the defrost button to force a manual defrost

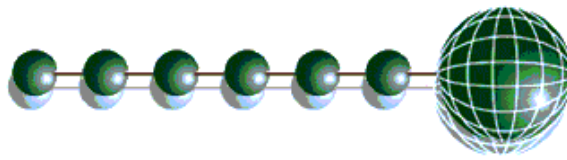
#### Main Display



4 character blue LED display, used to display time.



Ensure that all power is switched off before installing or maintaining this product



### Setting up the controller

Access to the controller can be achieved several ways

- Through the front mounted buttons
- Direct access by PC or palm top into the rear comms port. This requires a software package available on the RDM website
- Through legacy front end panels on 485 networks
- Through the RDM Data Director.

### Set-up Mode

#### Set-up through front buttons



The Mercury 2 Remote I/O normally displays the current time of day.

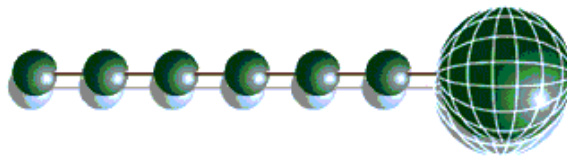
To enter set-up mode, hold the Enter and Down buttons together for approximately 3 seconds until the message “Ent” appears on the display. Now press the Enter button again to enter the function menu. IO will be displayed. Scroll up or down to go through the list.

#### Set-up Function Menu

Display	Option	Explained in Paragraph
IO	View Input/Output States	<a href="#">View Input/Output States</a>
PArA	Set/view Parameters	<a href="#">Set/view parameters</a>
Unit	Probe type and units	
rtc	Set/view Clock (rtc = Real Time Clock)	<a href="#">Real Time Clock</a>
nEt	Set/view network configuration	<a href="#">Network Configuration</a>
SoFt	View software version	
Ofst	Probe Offset	
ESC	Escape back to normal operation	



Ensure that all power is switched off before installing or maintaining this product



### Recommended set-up method

If you are not connecting to a network and want to set up the controller through the buttons we recommend you use the following order from the function menu.

#### rtc. Real time clock (This will automatically synchronise on network systems)

- a. Use the up or down buttons to scroll through the display until the display reads “rtc”
- b. Press enter. The display will show “t-1”. press enter again
- c. Scroll hours up or down (0 – 23) press enter
- d. Use up button to select “t-2”, press enter
- e. Scroll minutes up or down (0 – 59) press enter
- f. Repeat for t-3 (seconds 0 – 59)
- g. Repeat for t -4 (Days up to 31)
- h. Repeat for t -5 (months up to 12)
- i. Repeat for t -6 (Year up to 99)
- j. Use up button to display “ESC”, press enter to display “rtc”

Time clock is now set

#### PArA. Set/view parameters (This can be achieved at the network front end)

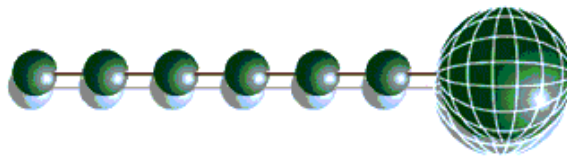
- a. From the function menu scroll to select PArA
- b. Pressing Enter while PArA is displayed will enter the parameter menu. The first parameter option will be displayed as P-01. Pressing the Up or Down button will present the other parameter options P-02, P-03 etc. See the parameter list below to find what parameter number corresponds to which actual parameter. Pressing the Enter button will show the current value of the selected parameter. Press Up or Down to modify the value and press Enter again to save the value. The parameter list number will be displayed again. Two other options are present in the parameter menu – dFLt and ESC. Selecting ESC will exit setup mode. Selecting dFLt will reset all parameters back to the default values for the current type of controller.

**Parameter Table:**  
**Parameter table for I/O Module**

Number	Parameter	Range	Step	Units	Default	Comments
P-01	Input Type Channel 1	0 = Probe 1 = Plant N/C 2 = Plant N/O	1	Degrees N/A N/A	0	
P-11	Input Type Channel 2	0 = Probe 1 = Plant N/C 2 = Plant N/O	1	Degrees N/A N/A	0	
P-21	Input Type Channel 3	0 = Probe 1 = Plant N/C 2 = Plant N/O	1	Degrees N/A N/A	0	
P-31	Input Type Channel 4	0 = Probe 1 = Plant N/C 2 = Plant N/O	1	Degrees N/A N/A	0	
P-41	Input Type Channel 5	0 = Probe 1 = Plant N/C 2 = Plant N/O	1	Degrees N/A N/A	0	
P-51	Input Type Channel 6	0 = Probe 1 = Plant N/C 2 = Plant N/O	1	Degrees N/A N/A	0	



Ensure that all power is switched off before installing or maintaining this product



## Network Configuration

The final section to set-up is the network address. In all instances, this must be done before the controller is plugged into the site network. The controllers have an auto-initialise function, which will automatically log the device onto the site network. If the wrong address has been entered onto the network, you will have to reset the controller address by setting the address to 00-0, and then re-enter the correct address. (You may have to deregister the wrong address from the home system as well).

To set the controller onto a network you must first connect the controller to a communications module. This is either a: -

- 485 Legacy, or
- IP Futura

### 485 Legacy module

- This product supports Genus compatible network protocol

Connecting a 485 legacy module to the controller will determine which set up screens are made available. Note: °F values are not supported on a RS485 network system.

Display	Option
485t	485 Network Type
485A	485 Address/Name
gAdd	Show underlying network address assigned to controller
rLog	Re-log the controller back onto the network
CLrA	Clear the address/name from the controller
ESC	Exit network menu. <b>N.B.</b> this option <b>must</b> be selected to save any changes made in this menu

The 485A option shows a value representing either the name of the controller in a Genus compatible network.

If the controller is set for Genus compatible then the value shown is of the form 05-6. This means the controller would try to log onto a Genus compatible network using the name 'RC05-6'.

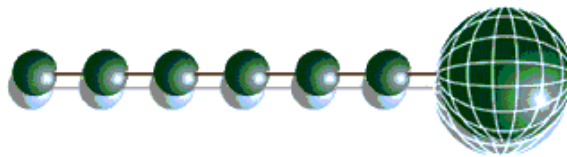
The following options are only available when the network type is set to Genus compatible.

The gAdd option displays (in hexadecimal format) the underlying network address assigned to the controller when it was logged onto the network.

The rLog option allows the controller to be logged back onto the network with its current name. The 'rLog' message will flash for confirmation. Press the Enter button to execute the command, Up or Down buttons to cancel.



Ensure that all power is switched off before installing or maintaining this product



## Fast Network Address Reset

The `CLrA` option will clear out the network address and name in the controller. The 'ClrA' message will flash for confirmation. Press the Enter button to execute the command, Up or Down buttons to cancel.

To enter this mode, hold the Enter, Up and Down buttons together for approximately 3 seconds until the message `CLrA` appears on the display. `CLrA` is the first option in the menu consisting of the following options:

Display	Option
CLrA	Clear the address/name from the controller
ESC	Exit Setup mode

Pressing the Enter button to select the `CLrA` option will cause the 'CLrA' message to flash for confirmation, if the network type is set to Genus compatible. Press the Enter button to execute the command, Up or Down buttons to cancel. If the network type is not set to Genus compatible then the `CLrA` message will not flash and the ESC option can be used to exit the menu.

## IP Futura module

In an IP system there are two options

- IP-L
- IP-r

IP-L allows you to fix an IP address into the controller, which you would use when you are connecting the controllers onto a customer's local area network. This would allow the customer to view each controller using Internet Explorer.

IP-r allows you to give each controller on the system a unique number. This number is then allocated a dynamic IP address by the system DHCP server (such as the RDM Data Director)

## IP-L

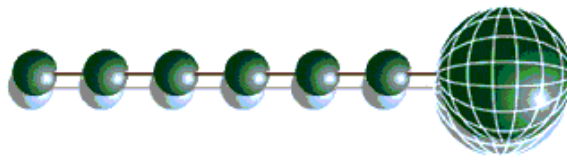
To configure the communication module for IP-L, set all three rotary switches to zero. The module should then be connected to the controller.

1. nEt. From the function menu you can now select nEt
  - Press enter and the display will show "IP-L", press enter
  - You can now set the address using the table below

Display	Option
IP-1	IP Address byte 1
IP-2	IP Address byte 2
IP-3	IP Address byte 3
IP-4	IP Address byte 4
nL	Network Mask Length
gt-1	Gateway Address byte 1
gt-2	Gateway Address byte 2
gt-3	Gateway Address byte 3
gt-4	Gateway Address byte 4
ESC	Exit network menu. <b>N.B.</b> this option <b>must</b> be selected to save any changes made in this menu



Ensure that all power is switched off before installing or maintaining this product



### IP-r

To configure the communication module for IP-r, set the three rotary switches to give each controller a unique identifier. The module should then be connected to the controller and the network.

The green network LED on the controller will flash until it has been logged on to the network. The Green network LED will remain permanently on while it is on-line.

### Normal Operation

During normal operation, the controller will display the current "Time of Day" . If the controller is on a network and on-line, the green network LED will be on.



The Network green LED flashes if the controller goes off-line or loses its given address.

### Viewing

Apart from setting up the controller, you can also view the status of the inputs and outputs.

1. IO. View Inputs / Outputs and States
  - a. From the function menu, select "IO", press enter
  - b. You can now scroll through the IO tables as set out below. The tables you view will depend on the controller type configuration.

### Input/Output table for Remote Module

Number	IO	Range	Step	Units
I-01	Input 1			
I-02	Input 2			
I-03	Input 3			
I-04	Input 4			
I-05	Input 5			
O-01	Relay 1	0 = off, 1 = on	N/A	N/A
O-02	Relay 2	0 = off, 1 = on	N/A	N/A
O-03	Relay 3	0 = off, 1 = on	N/A	N/A
O-04	Relay 4	0 = off, 1 = on	N/A	N/A
O-05	Relay 5	0 = off, 1 = on	N/A	N/A

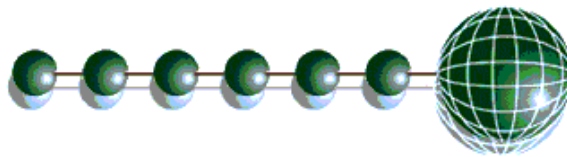
### Display Messages

The following messages can appear on the Mercury display.

Display	System status
Time of Day	Controller On



Ensure that all power is switched off before installing or maintaining this product



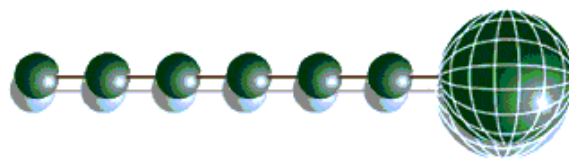
## Remote Commands

Values for analogue input block values:	Probe 1	<i>returns probe 1 value</i>
	Probe 2	<i>returns probe 2 value</i>
	Probe 3	<i>returns probe 3 value</i>
	Probe 4	<i>returns probe 4 value</i>
	Probe 5	<i>returns probe 5 value</i>
	Probe 6	<i>returns probe 6 value</i>
Values for Digital Input (Plant) fault values:	Plant 1	<i>returns Plant 1 status</i>
	Plant 2	<i>returns Plant 2 status</i>
	Plant 3	<i>returns Plant 3 status</i>
	Plant 4	<i>returns Plant 4 status</i>
	Plant 5	<i>returns Plant 5 status</i>
	Plant 6	<i>returns Plant 6 status</i>
Values for digital input (switch) values:	Switch 1	<i>returns Switch 1 status</i>
	Switch 2	<i>returns Switch 2 status</i>
	Switch 3	<i>returns Switch 3 status</i>
	Switch 4	<i>returns Switch 4 status</i>
	Switch 5	<i>returns Switch 5 status</i>
	Switch 6	<i>returns Switch 6 status</i>
Send values to "Control State"	0 for Normal	
	1 for Amber (defrost) LED	
	2 for Red (alarm) LED	
	3 for Amber and Red LED's on	
Values for Digital Output values *	Remote Relay 1	<i>controls relay 1</i>
	Remote Relay 2	<i>controls relay 2</i>
	Remote Relay 3	<i>controls relay 3</i>
	Remote Relay 4	<i>controls relay 4</i>
	Remote Relay 5	<i>controls relay 5</i>

\* Note: Relays 1, 2, 3 & 4 are energised when software state for that relay shows off.  
Relays 5 is not energised when software state for that relay shows off.



Ensure that all power is switched off before installing or maintaining this product



## Specification

### Power requirements:

Supply Voltage Range:	100 - 240 Vac $\pm$ 10%
Supply Frequency:	50 - 60 Hz
Maximum supply current:	5.2 Amps (when relay 5 is fully loaded)
Typical supply current:	<1 Amp
Operating temperature range:	+5°C to +50°C
Operating Humidity:	80% maximum
Storage temperature range:	-20°C to +65°C
Environmental:	Indoor use at altitudes up to 2000m, Pollution Degree 1, Installation Category II. Voltage fluctuations not to exceed $\pm$ 10% of nominal voltage
Size:	78mm (W) x 36mm (H) x 110mm (D)
Approx Weight:	170 Grams
Safety:	EN61010
EMC:	EN61326; 1997 +Amdt. A1; 1998
Ventilation:	There is no requirement for forced cooling ventilation
Class 2 Insulation:	<b>No</b> protective Earth is required and <b>none</b> should be fitted.

The host equipment must provide a suitable external over-current protection device such as: -  
 Fuse: 6.3A 240 Vac Antisurge (T) HRC conforming to IEC 60127  
 Or MCB: 6A, 240 VAC Type C conforming to BS EN 60898

The host equipment must provide adequate protection against contact to hazardous live parts.

### Relays

Max current relay 1:	6A (non inductive) COS $\phi$ =0.4 2A (inductive load) 200,000 operations
Max Voltage relay 1:	250Vac, 30V dc
Exclusive common	
Max current relay 2:	6A (non inductive) COS $\phi$ =0.4 2A (inductive load) 200,000 operations
Max Voltage relay 2:	250Vac , 30V dc
Exclusive common	
Max current relay 3:	6A (non inductive) COS $\phi$ =0.4 2A (inductive load) 200,000 operations
Max Voltage relay 3:	250Vac
Exclusive common	
Max current relay 4:	6A (non inductive) COS $\phi$ =0.4 2A (inductive load) 200,000 operations
Max Voltage relay 4:	250Vac
Exclusive common	
Max current relay 5:	3A (non inductive) COS $\phi$ =0.4 2A (inductive load) 200,000 operations
Max Voltage relay 5:	250Vac (Internal supply)
Common connected to Supply Live	

For compliance with the LVD, relays 3, 4 and 5 commons must be at the same potential as the supply voltage.

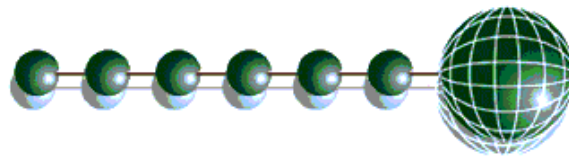


### Warning:

Relay 5 output has hazardous voltages (Supply input voltage potential).



Ensure that all power is switched off before installing or maintaining this product

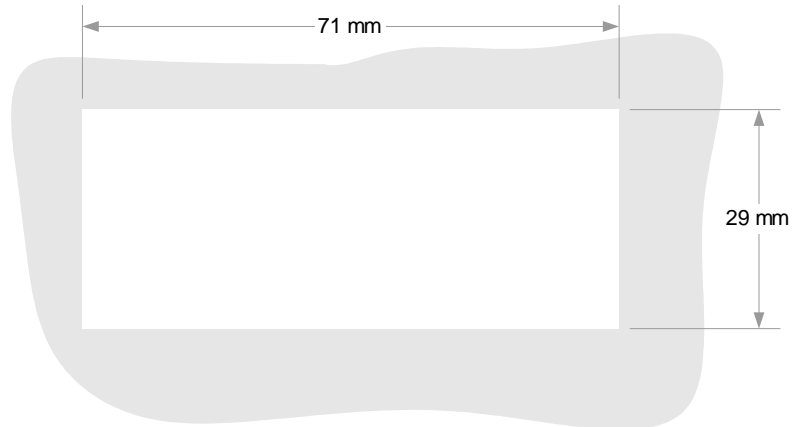


**Comms:**

RS232 with flow control

**Installation:**

**Panel Cut-out:**



The Mercury 2 fascia is 78mm x 36mm and is central around the cut-out.

**Fixing:**

The controller is fixed by sliding the 2 plastic retaining clips up to rear of the panel. These clips have a ratchet action and can be removed by holding in the clip sides and sliding back.

**Clearances:**

Space required behind the panel: 120mm + space for cable bends

Space required behind the panel on the right hand side (looking from the front): 30mm + bend radius for a Cat5 patch lead

Space required behind the panel on the left hand side (looking from the front): 20mm

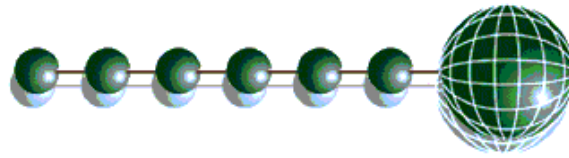
There is no requirement for forced cooling ventilation

**Cleaning:**

Do not wet the controller when cleaning. Clean the front by wiping with slightly dampened lint free cloth.

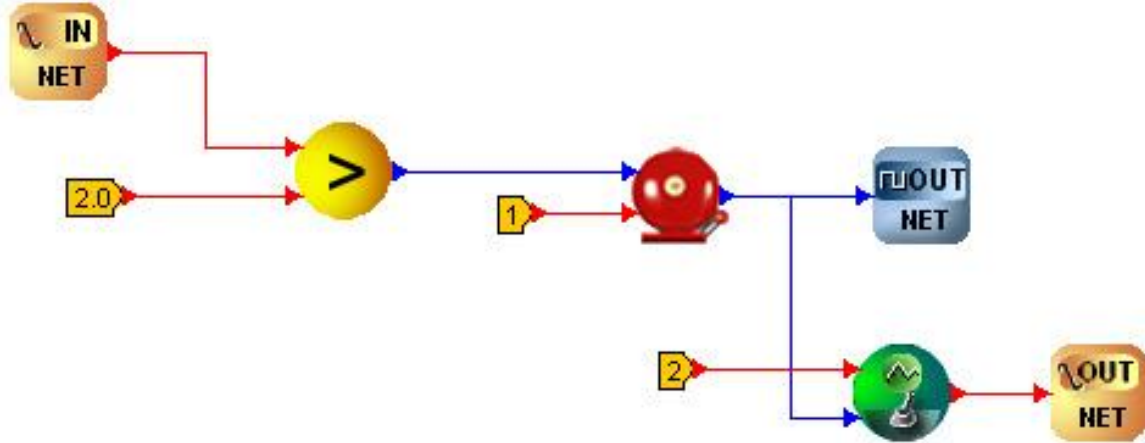


Ensure that all power is switched off before installing or maintaining this product



Appendix 1

Using the I/O module with the Data Builder (Controller Editor) Program



The above diagram shows how the I/O module can be used as a simple over temperature alarm with relay. The “analogue in” block has its value “mapped” to one of the I/O module probes. The probe value is compared with a set-point, which when over the set-point causes the output to be true. This is connected to an alarm block which alarms after the preset delay of 1 minutes. The “digital out” block is “mapped” to one of the I/O modules relays. The alarm LED on the I/O module is brought on by sending the value 2 to the I/O module “Control State”

Analogue Input block properties:

Set Units → Units: Deg. C  
 Set Type to Network → Type: Network  
 Set Device to I/O module name → Device: NJ01-1  
 Set Value to Probe number → Value: Probe 1

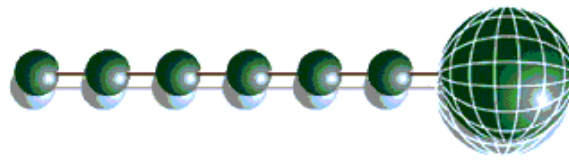
Simulation Settings  
Value: -1.1

OK Cancel

Java Applet Window



Ensure that all power is switched off before installing or maintaining this product



### Digital Output Block properties

- Set Type to Network →
- Set Device to I/O module name →
- Set Value to Remote Relay *number* →

### Analogue Output Block properties

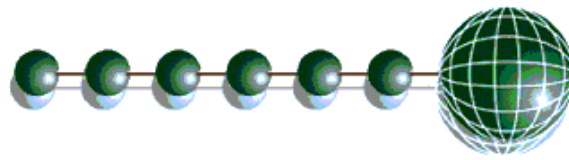
- Set Type to Network →
- Set Device to I/O module name →
- Set Value to Control State →

### Control State Values: -

- 0 = no LED's on
- 1 = Amber (defrost) LED on
- 2 = Red (Alarm) LED on
- 3 = Amber & Red LED's on



Ensure that all power is switched off before installing or maintaining this product



## Revision History

Revision	Revision	Changes	Comments
1.1	23/05/2008	Added relays states on power-up	
1.2	18/09/2009	Technical specification amended	
1.2A	29/12/2009	Technical specification amended	
1.2B	10/08/2010	Input/Output allocation table amended	



Ensure that all power is switched off before installing or maintaining this product